

DEVELOPMENT STATUS OF CASSINI RADAR FOR REMOTE SENSING OF TITAN

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Cassini Radar is a multimode radar instrument designed to probe the optically inaccessible surface of Titan, Saturn's largest moon. The instrument will be included in the payload of the Cassini Mission to Planet Saturn. The spacecraft is scheduled for launch in 1997 and is expected to begin its 4-year tour of the entire Saturnian system shortly after the Saturn orbit insertion in 2004. The individual modes of the Cassini Radar will allow surface imaging at few hundred meters to few kilometers resolution, topographic mapping along the nadir track, and mapping of the surface backscattering cross sections and brightness temperatures.

Cassini Radar instrument is developed jointly between NASA/JPL, Italian Space Agency and its contractor, Alenia Spazio (A.S.). The flight instrument is consisted of four major components: the Radio-Frequency Electronics Subsystem (RFES), the Digital Subsystem (DSS), the Energy Storage Subsystem (ESS), and the Antenna Subsystem (ANT). A.S. is responsible for developing the RFES and ANT, while JPL is responsible for developing the DSS and ESS, as well as integration and testing of the entire instrument. Because of the constraints on mass and volume of the spacecraft, this radar instrument is designed to be significantly smaller and lighter than most of today's remote sensing radars. In addition, the radar antenna is being developed as part of the spacecraft's high-gain antenna to further cut back on the space consumption. After two years of design and development, the Cassini Radar design configuration has been finalized and the breadboard model has been implemented. Detailed functional and performance tests of the breadboard model began in January 1994 and the results of the breadboard test are being used for subsequent design modification and fabrication of the flight unit. In this paper, we will discuss the functionality, performance parameters, and the instrument configuration of this sensor. Recent breadboard testing results will also be presented.

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